1. What is the domain and range of the function? Interval notation

2. What is the value of f(3)?

3. What is the value of x when f(x) = 0?

4. What is the maximum?

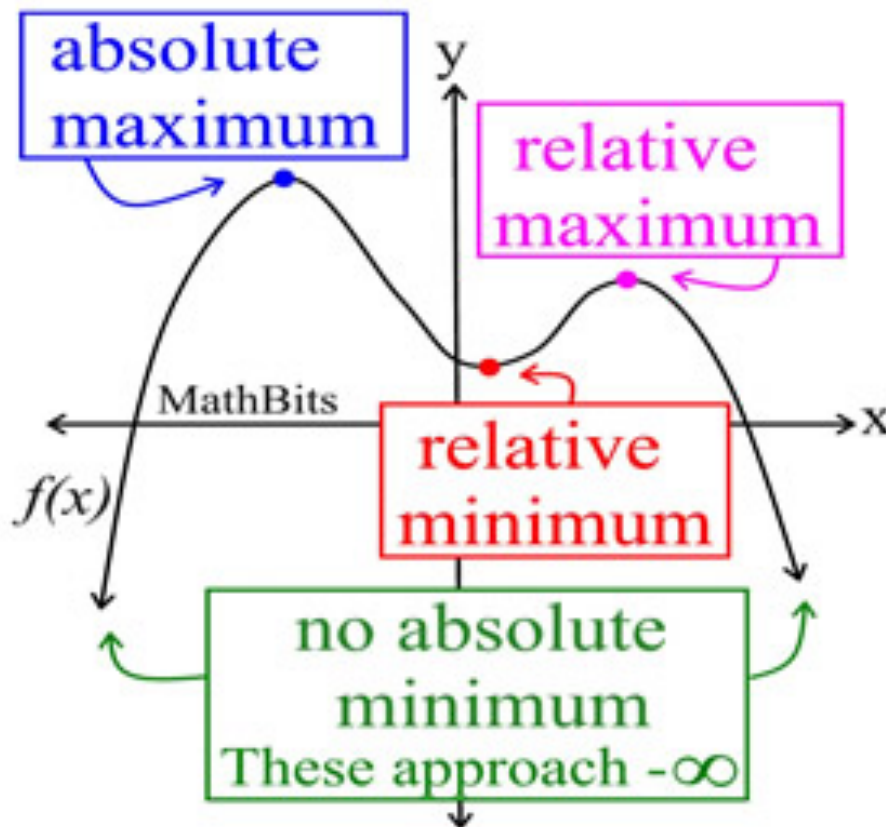# Check Homework

Features We Have Discussed
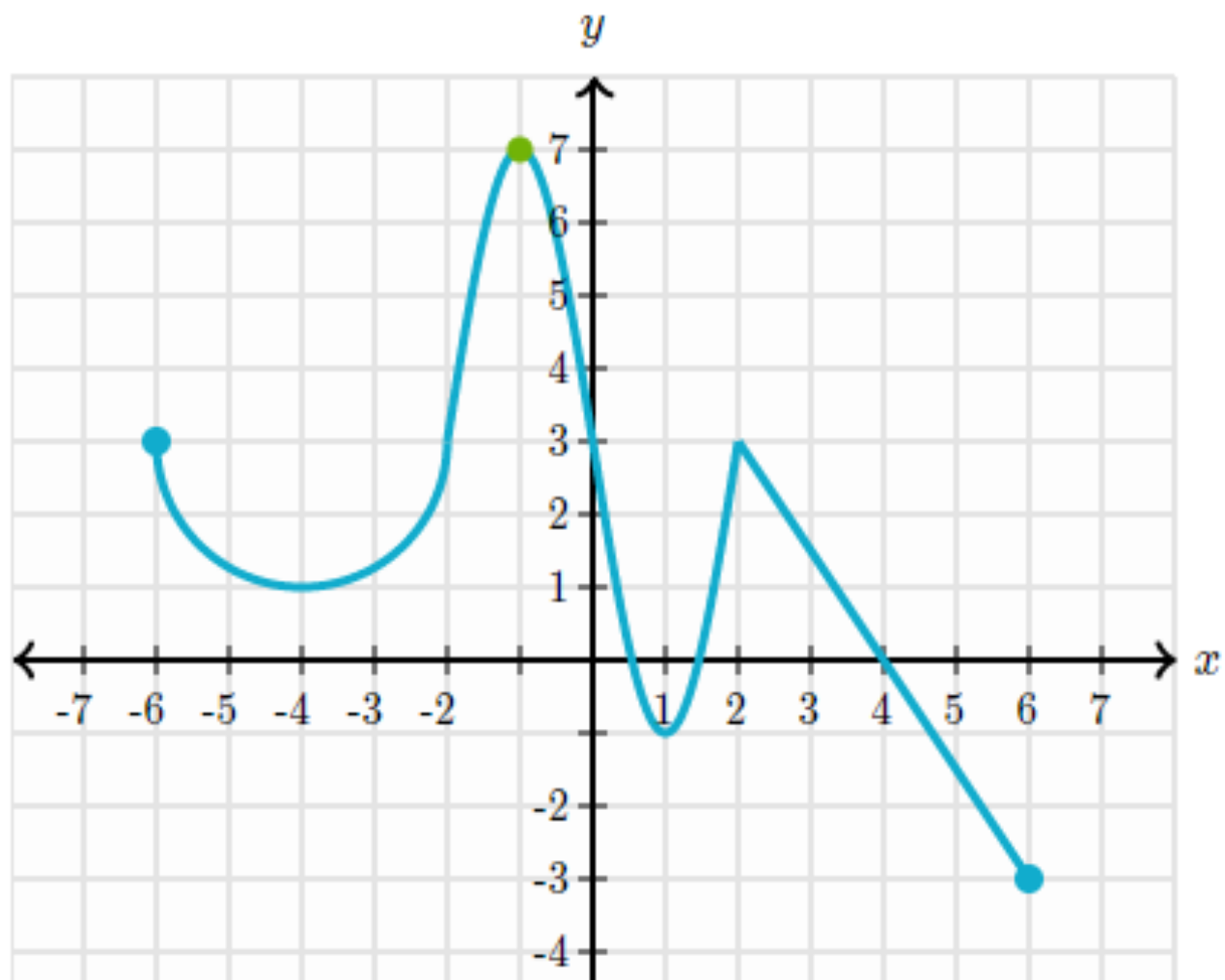
- Domain and Range
  - End Behavior
    - Increasing
    - Decreasing
    - X-Intercept
    - Y-Intercept
    - Maximum
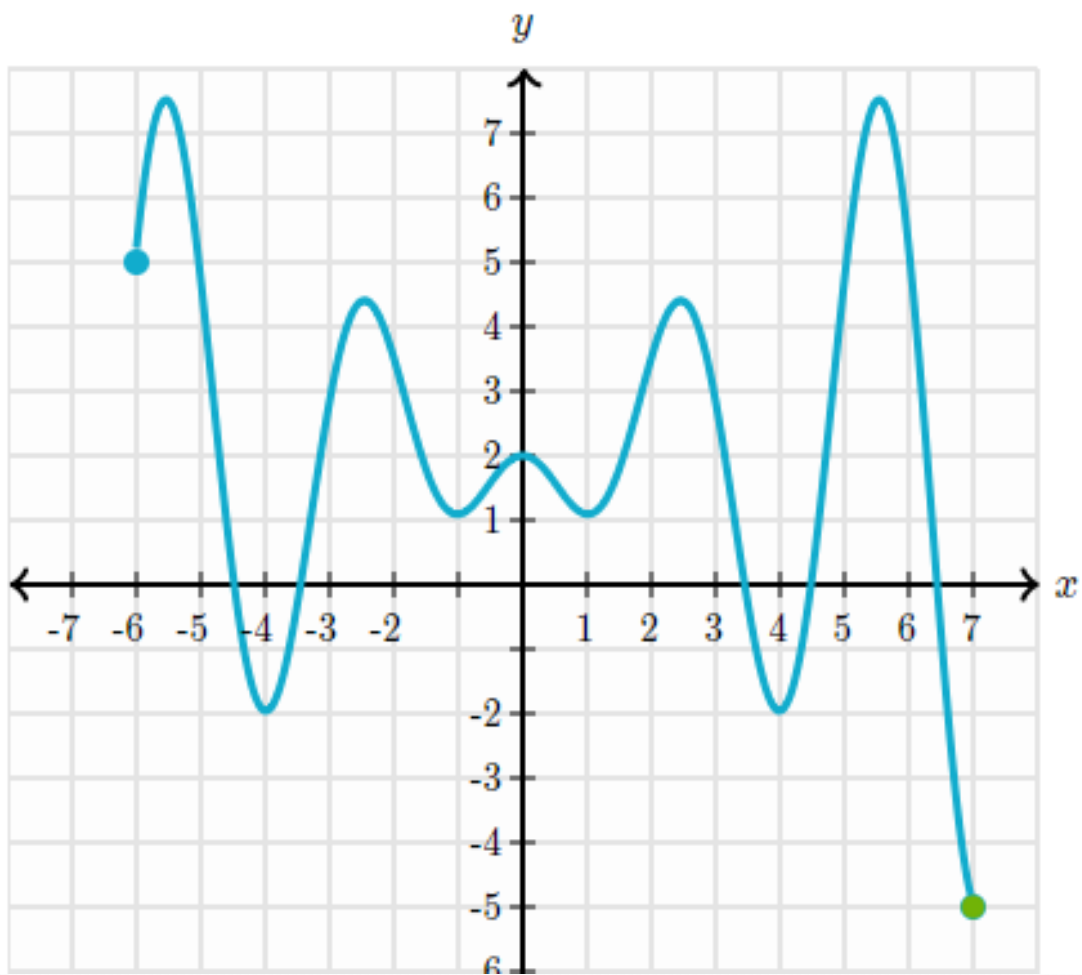   - Minimum
- Average Rate of Change

Maximum and Minimums

https://www.khanacademy.org/math/algebra/algebra-functions/maximum-and-minimum-points/e/recognize-maxima-and-minima

Mark the *absolute maximum* point of the graph.

Mark the *absolute minimum* point of the graph.

Average Rate of Change

- https://www.youtube.com/watch?v=lQRiw264bnI

Rate of Change

▶ The **rate of change** is the ratio of the change of one quantity to a change in another quantity.

▶ Example:

- The table shows the amount of water evaporating from a swimming pool on a hot day. Find the rate of change in gallons with respect to time.

Time (hours)	2	6	12
Gallons evaporated	4.5	13.5	27

Rate of Change

- Where is the greatest rate of change on the graph? What is the value?
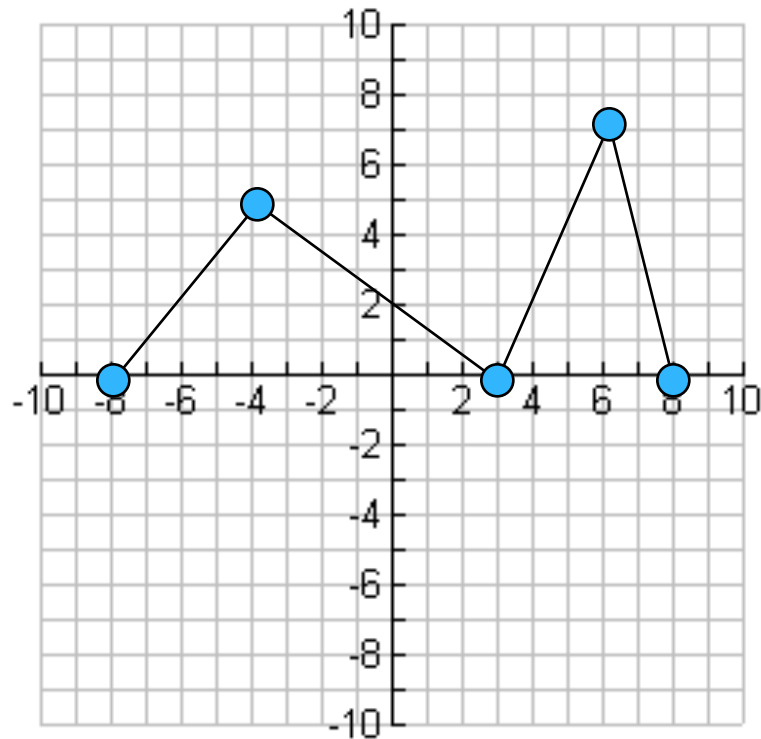
What kind of function do you find slope for?

- We only find slope for linear functions
- The slope of a line does not change no matter where you find it on the line.
- This is called constant rate of change

What do we do for other types of functions?

- Find the average rate of change in a specific interval. (It will change for each different interval!)
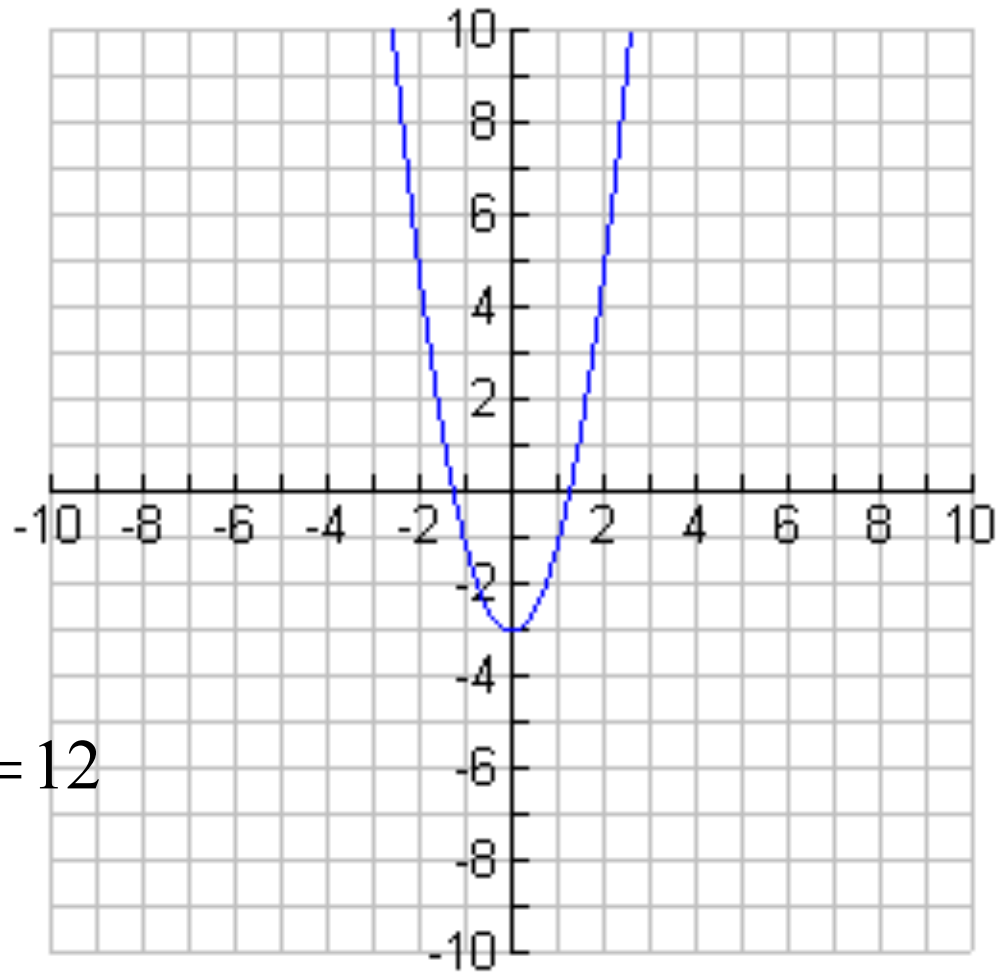
Average Rate of Change

- The **average rate of change** between any two points $(x_1, f(x_1))$ and $(x_2, f(x_2))$ is the change of y over the change in x at the two endpoints of the interval.

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad becomes \quad \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

Example 1

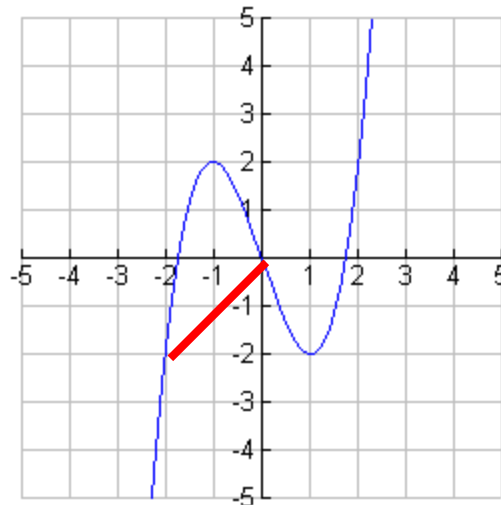- Find the average rate of change of $f(x) = 2x^2 - 3$ from $x = 2$ to $x = 4$.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{f(4) - f(2)}{4 - 2}$$

$$= \frac{29 - 5}{4 - 2} = \frac{24}{2} = 12$$

Example 2

- Find the average rate of change of $f(x) = x^3 - 3x$ from $x = -2$ to $x = 0$.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{f(0) - f(-2)}{0 - (-2)} = \frac{0 - (-2)}{2} = \frac{2}{2} = 1$$

Worksheet

Homework

- Worksheet